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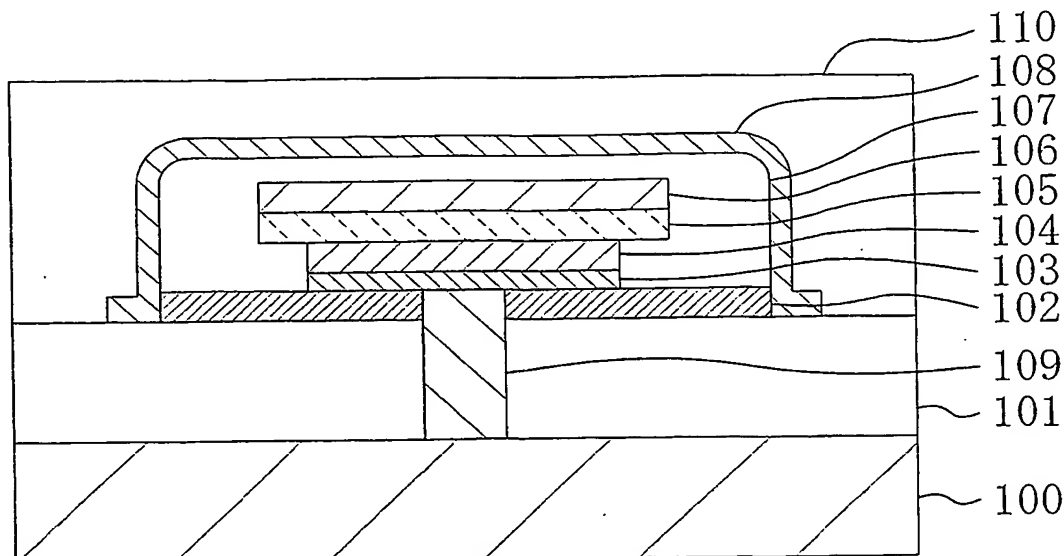
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(54) Title: SEMICONDUCTOR DEVICE AND PROCESS FOR PRODUCING THE SAME

(54) 発明の名称: 半導体装置及びその製造方法



(57) Abstract: A semiconductor device comprising a first hydrogen barrier film, a capacitor element superimposed on the first hydrogen barrier film and a second barrier film formed so as to cover the capacitor element. The first hydrogen barrier film and the second barrier film each contain at least one atom of the same type for close bonding between the first hydrogen barrier film and the second barrier film.

(57) 要約: 半導体装置は、第 1 の水素バリア膜と、第 1 の水素バリア膜の上に形成された容量素子と、容量素子を覆うように形成された第 2 の水素バリア膜とを備える。第 1 の水素バリア膜及び第 2 の水素バリア膜は、第 1 の水素バリア膜と第 2 の水素バリア膜とを密着させる同一種の原子を少なくとも 1 つ含んでいる。

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NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG,
CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

2文字コード及び他の略語については、定期発行される
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のガイダンスノート」を参照。

添付公開書類:

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27 May 2003 (27.05.2003)

Applicant

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. et al

The International Bureau transmits herewith the following documents:

copy of the international application as published by the International Bureau on 09 December 2004 (09.12.2004) under
No. WO 2004/107446copy of international application as republished by the International Bureau on under
No. WOFor an explanation as to the reason for this republication of the international application, reference is made to INID codes (15), (48)
or (88) (*as the case may be*) on the front page of the attached document.The International Bureau of WIPO
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/003450

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl⁷ H01L27/105, H01L27/108, H01L21/8242

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl⁷ H01L27/105, H01L27/108, H01L21/8242

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1926-1996 Jitsuyo Shinan Toroku Koho 1996-2004

Kokai Jitsuyo Shinan Koho 1971-2004 Toroku Jitsuyo Shinan Koho 1994-2004

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1298730 A2 (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.), 02 April, 2003 (02.04.03), Figs. 1 to 5 & US 2003/0058709 A1 & CN 1409398 A & JP 2003-174145 A Figs. 1 to 5	1-2, 16, 20
X	JP 2002-110931 A (Matsushita Electric Industrial Co., Ltd.), 12 April, 2002 (12.04.02), Figs. 5, 6 (Family: none)	1-2, 16, 20

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
09 June, 2004 (09.06.04)Date of mailing of the international search report
29 June, 2004 (29.06.04)Name and mailing address of the ISA/
Japanese Patent Office

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/003450

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2003-68987 A (Matsushita Electric Industrial Co., Ltd.), 07 March, 2003 (07.03.03), Figs. 5 to 16 & EP 1289017 A2 & US 2003/0042522 A1	1-2, 16-18, 20
A	JP 2001-7303 A (Toshiba Corp.), 12 January, 2001 (12.01.01), Figs. 26 to 38 & US 6548844 B & US 2003/0094645 A1	1-2, 16-18, 20
A	JP 11-126881 A (Hitachi, Ltd.), 11 May, 1999 (11.05.99), Figs. 1 to 11 (Family: none)	1-2, 16-18, 20

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2004/003450

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

In order for a group of inventions claimed in claims to satisfy the requirement of unity of invention, there must be special technical features for linking the group of inventions so as to form a single general inventive concept. In this connection, it appears that the group of inventions claimed in claims 1-38 are linked with each other only in the matters "comprising a first hydrogen barrier film, a capacitor element superimposed on the first hydrogen barrier film and a second barrier film formed so as to cover the capacitor element" and "close bonding between the first hydrogen barrier film and the second barrier film". However, these matters cannot be special technical features because they are (continued to extra sheet)

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: 1-2, 16-18 and 20

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

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Continuation of Box No.III of continuation of first sheet(2)

described in EP 1298730 A2 (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 02 April, 2003 (02.04.03) [especially Figs. 1-5, hereinafter referred to as "Reference 1"] and JP 2002-110931 A (MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD.) 12 April, 2002 (12.04.02) [especially Figs. 5 and 6, hereinafter referred to as "Reference 2"].

Consequently, there exist no special technical features for linking the group of inventions claimed in claims 1-38 so as to form a single general inventive concept. Therefore, it is apparent that the group of inventions claimed in claims 1-38 do not satisfy the requirement of unity of invention.

Now, the number of inventions, i.e., number of inventions (invention groups) linked with each other so as to form a single general inventive concept, claimed in the claims of this international application will be studied.

Claims 1-3, 12-15 and 16-24

It appears that the group of inventions claimed in claims 1-3, 12-15 and 16-24 are linked with each other only in the matter "the first hydrogen barrier film and the second barrier film each contain at least one atom of the same type for close bonding between the first hydrogen barrier film and the second barrier film". However, this matter cannot be special technical features because it is described in the above References 1 and 2.

Further, the matter "the first hydrogen barrier film and the second barrier film at the peripheral region of the capacitor element are closely bonded to each other through chemical bonding of atoms of the same type" also cannot be special technical features because it is substantially described in the above References 1 and 2.

Therefore, from the viewpoint of specified aspects of inventions as recited in the claims, it appears that the claims 1-3, 12-15 and 16-24 of this international application claim seven inventions consisting of those of claims 1-2, 16-18, 20, 3, 12, 13, 14-15, 19 and 21-24.

Claims 4-5 and 25-26

The group of inventions claimed in claims 25-26 relate to a productive process for the invention of claims 4-5. Consequently, it appears that there exist common special technical features for linking claims 4-5 with claims 25-26 so as to form a single general inventive concept.

Claims 6-9 and 35-38

The group of inventions claimed in claims 35-38 relate to a productive process for the invention of claims 6-9. Consequently, it appears that there exist common special technical features for linking claims 6-9 with claims 35-38 so as to form a single general inventive concept.

Claims 10 and 27-30

The group of inventions claimed in claims 27-30 relate to a productive process for the invention of claim 10. Consequently, it appears that there exist common special technical features for linking claim 10 with claims 27-30 so as to form a single general inventive concept.

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Continuation of Box No.III of continuation of first sheet(2)

Claims 11 and 31-34

The group of inventions claimed in claims 31-34 relate to a productive process for the invention of claim 11. Consequently, it appears that there exist common special technical features for linking claim 11 with claims 31-34 so as to form a single general inventive concept.

Therefore, the claims 1-38 of this international application claim 11 inventions.